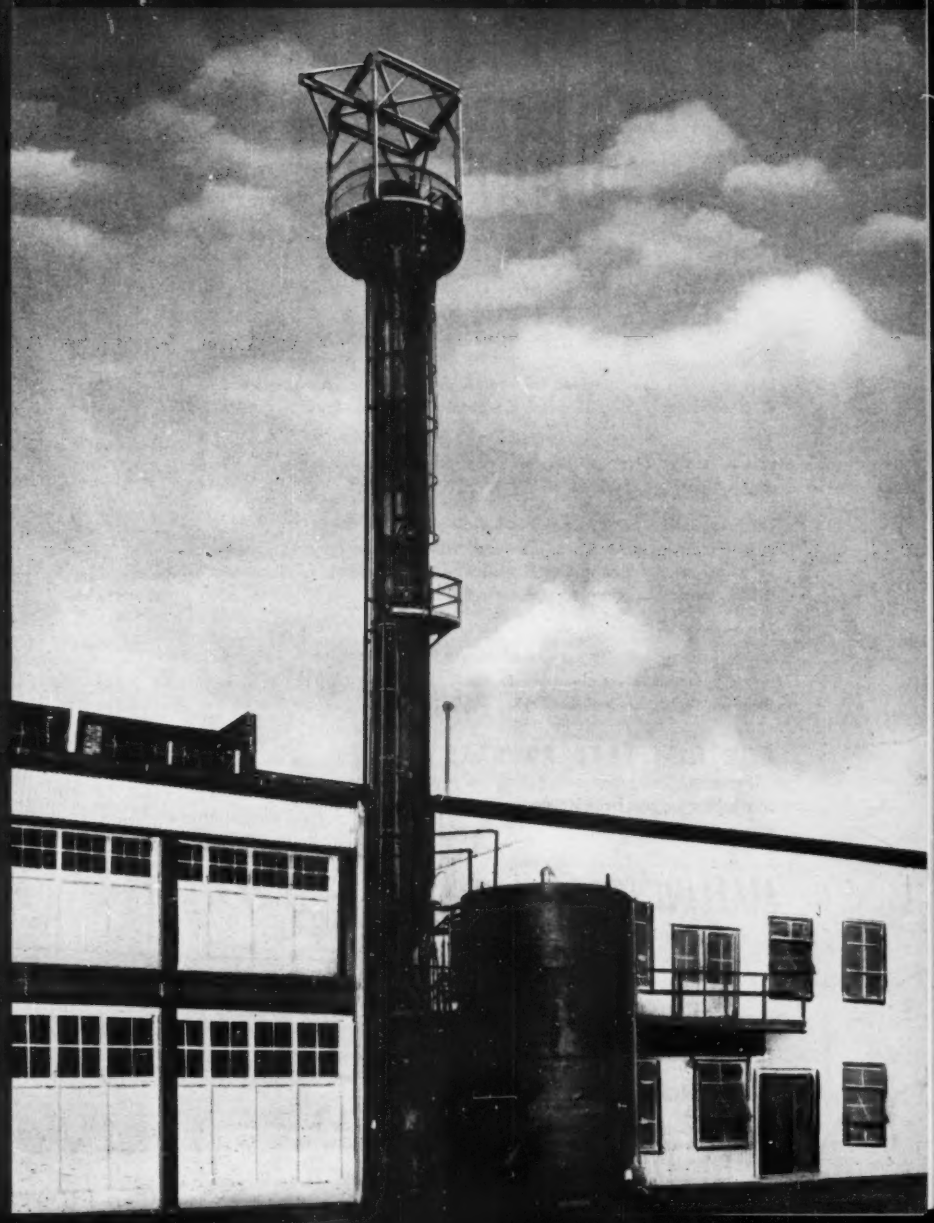
The Institute Spokesman

AUGUST 1952



OFFICIAL PUBLICATION

NATIONAL LUBRICATING GREASE INST. NLGI

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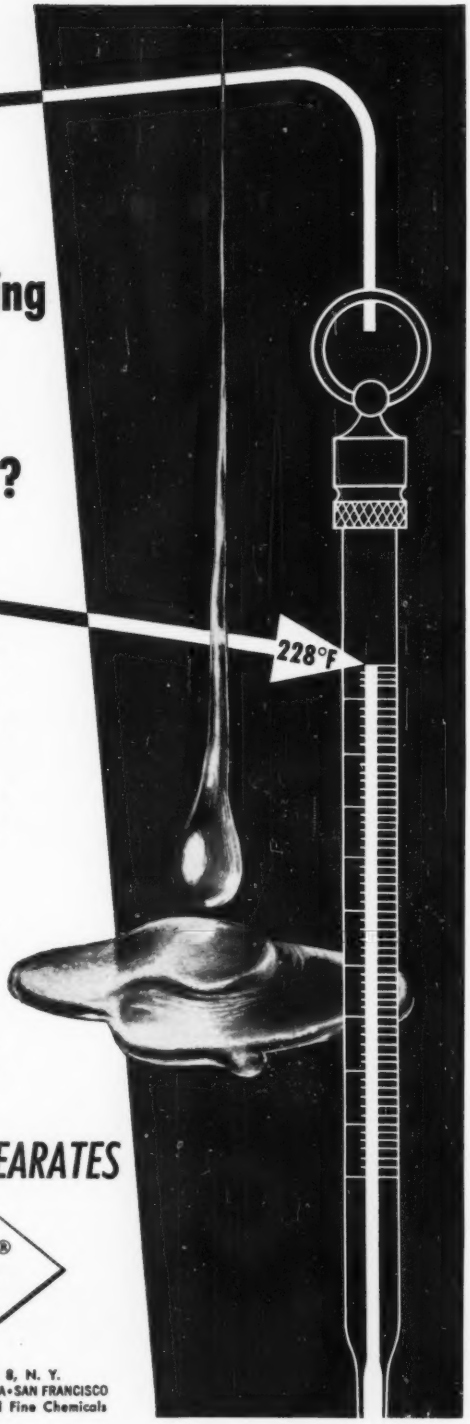

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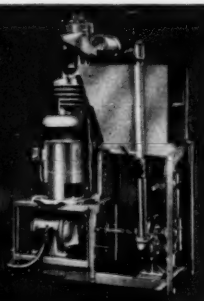

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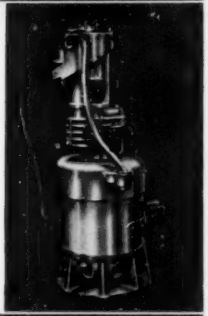

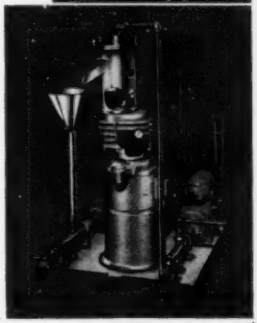

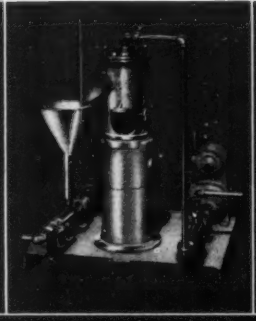

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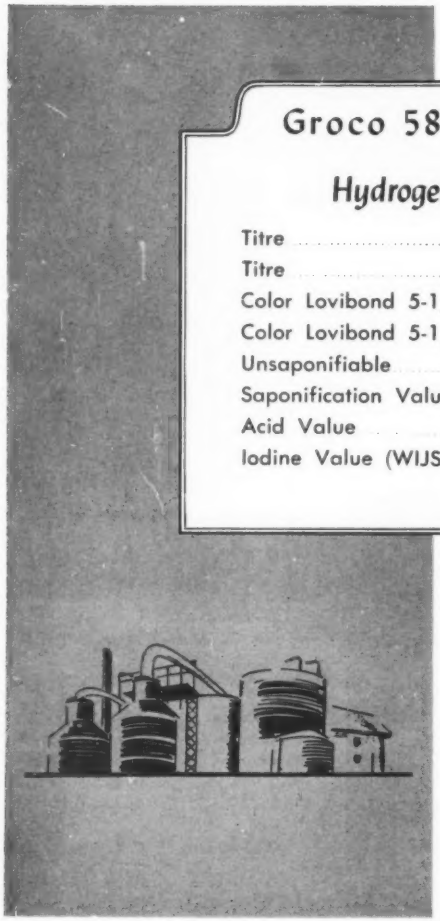

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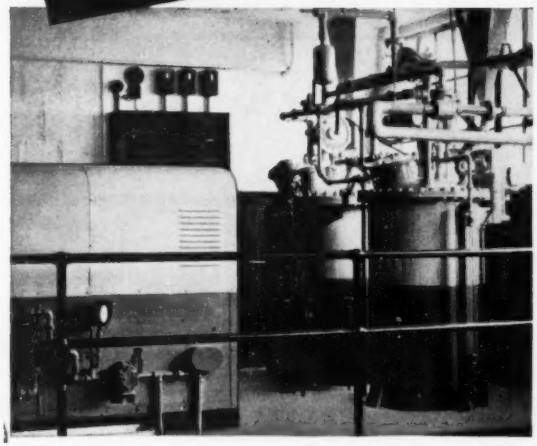

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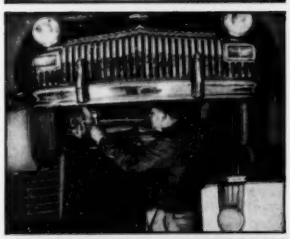

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ABOUT THE COVER

Pictured on the cover is a high pressure fat splitting column, a part of the highly effective counter-current hydrolysis unit adopted as a replacement for obsolete equipment about three years ago by A. Gross & Company at its plant in Newark, New Jersey.

Not shown are specially designed high pressure boilers and pumps, as well as the many controls necessary to operate a continuous system. Samples representing various levels within the lower part of the column are obtained through a series of try-cocks conveniently terminating near the ground level.

Under conditions precluding side reactions and at approximately 700 psi and 500° F., a 98% hydrolysis is readily and regularly achieved without the use of catalysts. Contact with only highly-resistant stainless steel during the relatively short reaction cycle of about four hours permits the release of fatty acids of every type, with a minimum change in chemical structure. A highly effective split and the presence of only natural constituents provide the most desirable type of material for high vacuum distillation.

A combination of most effective design and control in both splitting and distillation yields distilled fatty acids possessing uniformly high quality and composition consistent with the increasing demands of consuming industries.

President's page

by George E. Merkle, President, N.L.G.I.

WHERE ARE WE HEADING?

It is very likely that a great majority of the peoples of all countries have often asked themselves in recent years, "Where Are We Heading?" This is a most logical question because of the chaotic conditions facing us; and no one knows the answer.

True, there are always some wise men who have the answers, but they often wake up to find how wrong were their guesses. There are many people having enough intelligence and common sense to predict the general trend and eventual outcome if certain conditions are not changed.

The big problem as I see it is to curb the activities of those who are creating a man-made economy designed to suit their particular desires at the expense of the public. Most of this can be traced to political leaders of the various countries who are hungry for power, glory and wealth. These are the moving forces causing strife between nations and in no small measure are the causes of the internal discord existing in many countries and especially in our own.

In spite of the fact that great numbers of our citizens are aware of these undesirable conditions and would like them corrected, they fall far short of taking any action to correct them by at least voicing their objections. Too often they are likely to say that things are bad and "so and so" should be done but finish with "What can we do about it?" They accept the conditions as inevitable.

We fight other countries for violations of our rights, why not assert ourselves here. Too many are "Yes Men" and lose their identity. Such people deserve the results of such actions but many others must suffer with them and often they are not in a position to help themselves.

We, the citizens of the United States, have seen our rights strangulated by pressure groups and our resources confiscated by those hungry for power, glory and wealth. This is a sad and most dangerous condition. Some think wage raises are the answer, but, to the contrary, this only aggravates the situation. What we need is the curbing of the monopolistic tactics of pressure groups and the elimination of regimentation and confiscation by hungry politicians. Then we will know where we are heading.

MINING EQUIPMENT is subject to very rugged operating conditions, dust and extremes of temperature.

Quality Control of Lubricants

by CARLYLE R. BURTON, Superintendent of Maintenance, Hibbing-Chisholm District, Oliver Iron Mining Division, United States Steel Co., Hibbing, Minn.

IT would be well to begin with an explanation of the title of the paper. "Quality control of lubricants" is a term used in the iron ore mining business to determine whether a lubricant is suitable for continued use in a piece of mining equipment.

In order to better understand the need for lubricant control, it is first necessary to describe the equipment used and second, the conditions under which it operates. Many types of equipment are used to mine iron ore such as 1000 to 2000 horsepower, diesel-electric locomotives, 300 to 400 horsepower, 30-ton trucks, 15 to 20-ton tractors, 40 to 50-ton diesel and diesel-electric locomotive cranes, road patrols, diesel engine powered shovels up to 5½-yard dipper capacity, electric shovels up to 6½-yard dipper capacity, service trucks, loaders, portable and stationary diesel, gas and electric air compressors and many other types of powered mechanical equipment. In addition to the mobile mining equipment, we have semi-permanent stationary installations for shops, underground mine hoist installations, etc. The majority of the mining equipment operates seven days a week, 24 hours per day. The men are on a 40-hour per week schedule, which means that the equipment is operated by a number of persons during a week. This constant changing of operating personnel necessitates a good control method for lubricant handling and application in order to eliminate the mixing of lubricants and insure the correct application and renewal of lubricants when required. Another obstacle to be overcome in properly lubricating mining equipment is the operating conditions. The majority of mining equipment is started and operates out-of-doors in sun, rain, and snow in temperatures ranging from plus 100° to minus 40° F.

The lubrication control program now in use by the Hibbing-Chisholm district of the Oliver Iron Mining Co., was started by first analyzing the lubrication requirements of all equipment in use and comparing what was required with what was being used. It was first discovered that over sixty-

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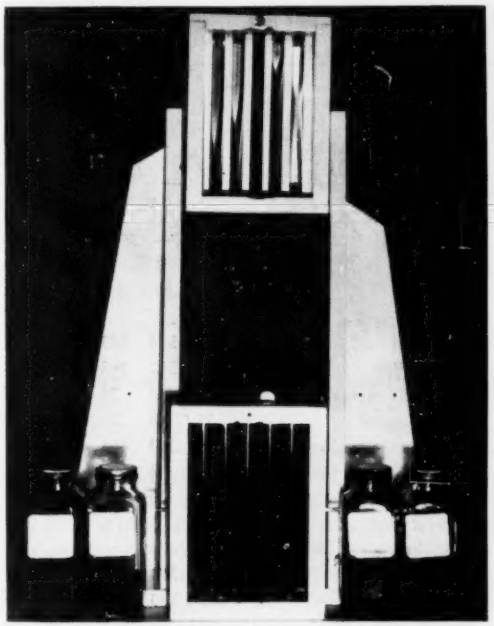
five different oils and greases were used for winter and summmer operation. By evaluating and consolidating, this number of lubricants was cut to 12 different products. This consolidation of lubricant brands and types has had a three-fold benefit; it minimizes the chance of the mixing of lubricants, it yields a benefit through volume purchasing of lubricants, and it requires less inventory and accounting expense.

The second step in establishing the controlled lubrication program was to make sure that the people responsible for lubrication knew what lubricant was to be used and where. This educational part of the program was attempted in the following manner. On machinery which presented complicated lubricating problems we assigned maintenance engineers to the job of making schematic charts showing each grease or oil check point and indicating the kind of lubrication, amount per application and the frequency of application required. These charts were posted on the equipment together with a list of the lubricants to be used on the particular equipment. This list is used in ordering lubricants from our central storage point.

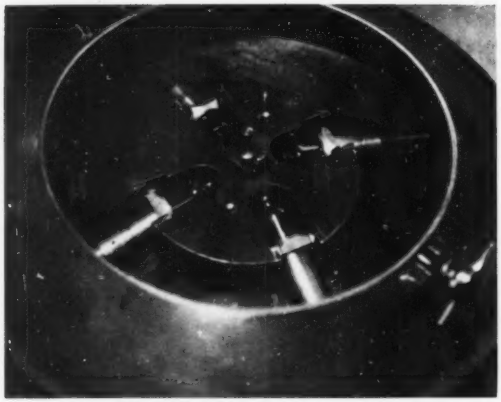
A sound slide film was made showing the correct method and the importance of lubricating a particular type of equipment. The aid of the operating foremen in the various mines was enlisted by having meetings at which the cost of improper lubrication was emphasized by citing costs of repair which could have been eliminated on the equipment in their charge by proper lubrication and by showing them the film slide on how and where the lubrication should be done. The workmen directly responsible for the lubrication of machines were then called in and instructed with the film slide, pointing out the costs of faulty lubrication and what was being done to make their job easier. The lubricator's job is being made easier by the installation of the lubrication charts, power greasing equipment, both air and electric barrel pumps with retractable grease hose reels, centralized lubricating systems and better lubricant handling facilities. In some instances, for mobile equipment operating "around the clock," we have provided a lubrication truck, carrying the necessary lubricants, to go to the equipment on the job and aid in the lubrication.

The third phase of the controlled lubrication program involved insuring that the best lubrication was being obtained for the least amount of expense. First, one of the large expense items in our lubricant cost, engine crankcase oil, was checked to determine whether the recommended change period was correct. In order to decide whether the change period for crankcase oil was correct, a program was set up to take a sample daily from a representative group of each type of equipment. This sample was then analyzed to determine whether it would meet the minimum specification required for proper lubrication of that particular type of equipment. It was soon discovered that no blanket oil change period could be set up which would cover all engines in any particular type of equipment. The change period recommended by the engine manufacturer is the period that is best for the average engine. It does not mean that if the recommended change period is followed on all of their engines, no operating difficulties will be experienced due to faulty lubrication. Some engines may dilute the oil to a dangerous extent, due to faulty injection or poor carburetion, in a

OIL SAMPLES are taken daily from all equipment which is in continuous operation. These samples are sent to the analysis laboratory.



A SIMPLE VISCOSITY CHECK is made on the oil sample which is sent to the laboratory. This is done by comparing the rate of descent of a steel ball in the oil being checked against standard oil.



OIL SAMPLES are shown in the centrifuge.

ANOTHER LABORATORY TEST made is to run the oil sample through a centrifuge for twelve minutes.

TABLE I

Type of engine:

Equipment No. 598 Type of filter:

Date July		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Viscosity		30—	30—	30—	20+	30—	30—		30—	30—	30—						
		B	B	B	B	B	B		B	B	B						
Sediment		.09	.15	.14	.14	.18	.30		.30	.27	.10						
Corrosion																	
Hrs on oil	337	345	363	375	387	400	416		424	440							
Hrs on filter	337	345	363	375	387	400	416	XO	8	24							
Hrs on grease and filter	31	X8	26	38	X12	25	41		X8	24							
Hrs on nugent	31	X8	26	38	X12	25	41		X8	24							
Total hrs on engine to date	385	393	411	423	435	448	464		472	488							
Oil added 1 day (OT)		4			6	4	4	7	10	23	7	14					
Type of oil		26	104	86	83	82	105	60	50	91							
Type of fuel																	
Remarks:																	
Hrs on transmission	385	393	411	423	435	448	464		472	488							
Hrs on differential	385	393	411	423	435	448	464		472	488							
Hrs on torque converter																	
Screen																	

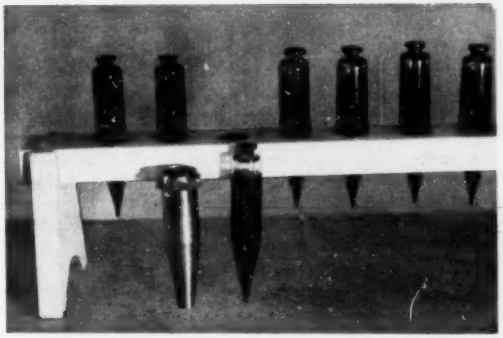
Equipment No.

relatively short number of hours, while others may develop water leaks into the lubricating system or contaminate the crankcase oil due to engine blowby or faulty operating temperature. Still other engines may continue to operate for hour after hour and the oil will remain in a "good as new" condition. It seemed reasonable to expect that if a simple check could be made daily of the crankcase oil condition in all engines it would be possible to decrease the oil change frequency and to minimize the danger of losing an engine due to faulty crankcase oil, as well as to extend engine life by reducing wear.

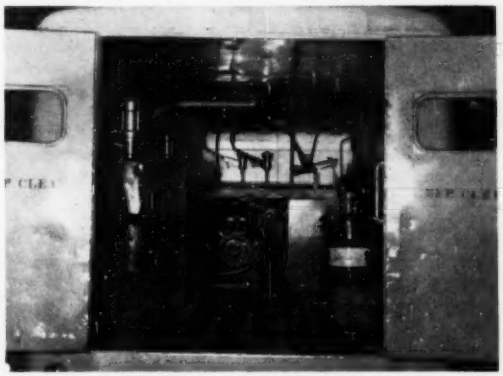
Utilizing the experience of lubrication experts from various oil companies, the following procedure was developed. Oil samples are withdrawn daily from all equipment that has been operating continuously and the samples are sent in to an oil analysis laboratory. The sample of oil is taken by using a special suction gun which was developed for the purpose. Some installations are provided with a pet-cock drain where a representative sample may be taken. However, we prefer the sample gun method because it eliminates the danger of oil loss due to vibration breaking of auxiliaries to the pet-cock drain or loosening of the pet-cock valve. It also avoids contamination of the sample.

Two simple checks are then made on the used crankcase oil; the first is a viscosity determination in which a small sample of the used oil is placed in a test tube with a steel ball. This tube is then placed in a rack along with other tubes containing samples of the same new oil of different viscosities. For example, if the used oil being checked was originally an SAE 30 oil, the samples of new oil would be SAE 30, 20, and 10. The falling sphere comparative rack is then tipped over and the dropping speed of the steel ball is noted in comparison with that of the steel balls in the samples of new oil of the different viscosities. The used oil is then rated as a plus or minus 30, 20 or 10, depending on the relation of its viscosity to the viscosities of the samples of new oil.

The sample is then diluted 50 per cent with benzene C_6H_6 in a special calibrated tube and is centrifuged for 12 minutes. After spinning, the percentage of solids, now accumulated in the end of the tube, is noted and recorded. The results of these two simple tests are then recorded on one sheet for comparison. The figures obtained from these two tests for the various samples of used oils are then compared with standard allowable limits of viscosity and sediment which have been established from our past experience. The viscosity limit is 10 points lower than the unused oil. For example, if the comparative viscometer indicated that the viscosity of a used oil sample was approximately the same as that of a new SAE 20 oil and the original oil had been an SAE 30, the unit would be allowed to operate. However, if the viscosity of the sample tested lower than the limit, steps would be taken to bring the unit in immediately for an oil change and a check-up. The limits on sediment have been set at 0.6 per cent by volume for a truck, tractor, grader, or car engine, and 0.14 per cent sediment by volume for a diesel locomotive or similar unit crankcase oil. If the sediment in the used oil sample is found to be above the limits we have set up, the oil laboratory calls for a cartridge change in the lubricating by-pass filter. Attempts are being made to standardize on a re-packable lubricating oil by-pass filter cartridge in order to lower the cost of a filter cartridge change.



THE AMOUNT OF SEDIMENT in the oil sample is checked, after going through the centrifuge, to see if it exceeds allowable limits.



A LUBRICATION SERVICE TRUCK is also used to move to certain pieces of equipment.

From the posting sheet, on which all the samples for that day are posted, the laboratory technician posts to an individual unit engine card the results of the sample examinations and the number of operating hours. A call sheet is then made out for each mine, garage or foreman, depending on the condition, using the complete sample posting sheet and the individual engine card sheet as a guide which lists any periodic check to be performed and the necessary measures to be taken to correct the faulty oil condition. Some of the items found on this sheet, that have been previously set up by the foreman in charge of the equipment, are: grease job (based on operating hours), oil change, oil filter cartridge change, injection system check, check for fuel, water or hydraulic oil or lubricating oil leaks, special filter checks or changes, or any other item the foreman in charge

TABLE II

OLIVER IRON MINING CO. DAILY SERVICE REPORT

Date: 7-26-51 Location: Pillsbury mine

Truck No.	Time	Grease service and nugent bag change	Time	Oil Filter change	Crankcase breather filter service	Time	Lube oil change	Time	Air filter change
599		X			X				X
600		X			X				X
486		X							
524				X			X		
401		X			X				X
359				X					

of the equipment may have set up on an hourly basis. The information from this sheet is then forwarded to the foreman, garage or shop, depending on how the work is to be handled; the work required is completed and the noted sheet is returned to the oil laboratory. Every two weeks the oil laboratory prepares a report that is sent to the lubrication foreman, truck and tractor foremen, locomotive foreman, and superintendent of maintenance. This report contains a two-week summary of the crankcase oil condition of equipment under the supervision of the oil laboratory. The report includes such items as total engine operating hours during the period the report covers, crankcase oil added, number of oil changes, number of filter changes, hours on the oil since last changed and hours on the filter since last changed. The report also tabulates the engine crankcase oil consumption in quarts per hour of each engine for a four-month period. This same report tabulates the units that had crankcase oil dilution of high sediment and fuel oil consumption. The report gives the maintenance foreman a very good picture of the engines under his care and allows him to plan for engine change-outs and overhaul in advance. When engines consume one quart or more per hour of crankcase oil, they are changed out or overhauled. See Table I.

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Santolube: Reg. U. S. Pat. Off.

At the present time there are 260 pieces of equipment for which the oil laboratory handles the quality control of the lubricants. The oil laboratory also analyzes incoming shipments of fuel oil, recommends cooling water treatment, and analyzes greases and oils to determine that they meet the specifications required. The cooling water is sampled periodically, tested, and reported in the same manner that the lubricating oil is handled.

The quality control of lubrication is one item in a preventive maintenance program which is in effect in the Oliver Iron Mining Co. This program is aimed at increased production with less downtime of equipment and at keeping repair and maintenance costs at a minimum. The quality control of lubricants has had good acceptance by the maintenance foreman because it eliminates clerical work that would have to be done by him or his mechanics, besides giving him a check on engine conditions. The maintenance foremen are now changing-out or overhauling engines based on an oil laboratory report on oil consumption. This means a planned delay instead of a breakdown to the mine operators. You may wonder how the expense of such a program is justified. It may be stated that the saving afforded the company due to volume purchasing and decreased oil consumption has more than paid for the expense involved in the described program. Decreased engine wear, which means lower repair and maintenance costs and increased mine production, is an additional benefit derived from the program.

With the aid of lubrication experts, further experimentation is being made toward the consolidation of oils, greases and various checks to arrive at even more effective quality control of lubricants.

DISCUSSION

presented by

DONALD E. WHITEHEAD, General Lubrication Engineer, Crucible Steel Co. of America, Pittsburgh, Pa.

CARLYLE R. BURTON, Superintendent of Maintenance, Hibbing-Chisholm District, Oliver Iron Mining Division, United States Steel Co., Hibbing, Minn.

WILLIAM M. SCHUCK, Lubrication Engineer, Armco Steel Corp., Middletown, Ohio.

MAURICE RESWICK, Engineer, Standard Oil Development Co., Linden, N. J.

ANDREW CICHELLI, Lubrication Engineer, Bethlehem Steel Co., Bethlehem, Pa.

CY ROBB, Maintenance Engineer, United States Steel Co., South Works, Chicago, Ill.

DONALD E. WHITEHEAD: I would like to hear about the hardships involved in the handling of lubricants in temperatures of forty degrees below zero, whether it is necessary to predilute those crankcase oils, and what greases could be used, in regard to the NLGI consistencies selected.

CARLYLE R. BURTON: In answering Mr. Whitehead's question with regard to how we handle lubricants in forty below zero weather, I first wish to say it is quite a problem. We use a winter and summer grade of lubricant. Equipment that is operated intermittently is changed over in the fall from summer to winter grade of lubricant and back again in the spring. Other equipment that operates continuously or around the clock, such as the large ore hauling trucks and locomotives are kept on summer grade lubricants. Some of our greases used in the winter are an extremely fluid material, but we increase our frequency of lubrication in an attempt to compensate for the loss in lubricant viscosity. In the past it has been the practice to dilute crankcase and gear housing lubricants. The crankcase lubricants were diluted with gasoline or kerosene and the gear case lubricants thinned with kerosene or penetrating oil. The oil companies have now developed low temperature lubricants that enable us to start equipment without diluting the lubricants. However, we do use starting fluids injected into the air intake manifolds of diesel engines on some units.

WILLIAM M. SCHUCK: It is evident that the quality control program as he has outlined it to us is a practical, workable, preventive maintenance tool that results in lowered costs and decreased operational delays. There are however, several points in Mr. Burton's paper that the speaker feels might be elaborated upon.

It was stated that daily test samples of crankcase oil are taken and tested for each unit operating on a continuous basis. This daily schedule was adopted at the advice of various oil company personnel. The speaker feels that a twenty-four hour sampling basis is an extremely short check period. Can you state whether this test period has been justified by practice and field experience?

The second periodic test described by Mr. Burton was a centrifuge check to determine the crankcase oil sediment volume. In this test, engines of the truck, tractor, grader and car engine classifications have been allowed a sediment limit of 0.6 per cent by volume while the diesel engine category has been limited to only 0.14 per cent allowable sediment. I am sure we would be interested in the reasons and practices whereby these limiting values were determined.

CARLYLE R. BURTON: In attempting to answer Mr. Schuck's question as to why a twenty-four hour sample period was chosen, a little past history may be pertinent. When our sampling program was originally started we intended to merely continue sampling long enough to determine if our oil changing practice was correct. We soon discovered that the oil change period we were then using resulted in excessive wear and the loss of occasional engines due to dilution or excessive dirt in the lubricant. By streamlining our sampling program, we found it sound practice to continue with our twenty-four hour sampling period in order to minimize our chances of losing an engine due to excessive

wear. The number of cases of dilution, caused by fuel or water, and dirty lubricants caused by engine blow-by or excessively dusty conditions, within the period of our past lubricant change period governed our decision to continue the twenty-four hour sampling period. We have lengthened our sampling period to a week for some equipment that is operated only eight hours per day.

In answer to the second question as to why the 0.14 per cent by volume sediment limit for diesel locomotives and 0.6 per cent by volume sediment limit for all other equipment was chosen, it may be stated that these figures were picked based on past experience. Recommendations were solicited from equipment and engine builders, oil companies and other users of similar equipment. This information combined with our actual experience with the per cent by volume sediment in the lubricant at the end of the recommended hours of use aided us in the selection of the per cent sediment limits of 0.14 and 0.6 per cent. The size of the unit, cost of overhaul, and the crankcase and filter capacity have indicated that we keep the sediment lower in our diesel locomotives than in trucks, tractors and similar units.

MAURICE RESWICK: I presume that one reason why Mr. Burton has chosen the twenty-four hour period for inspection of the oil is because the atmospheric conditions are such that the machinery becomes filled with dust. I am wondering if any special attention is necessary in the maintenance of the filters, such as more frequent reconditioning, or perhaps using a filter of larger size.

CARLYLE R. BURTON: Mr. Reswick's inference is correct for these units do operate at times under very dusty conditions. We have made special attempts to prevent the dust from getting into the crankcase oil. We do use an oil bath air cleaner, and we have cut the recommended filter change period down to an eight to ten hour period in some cases, the average length of service on the truck and locomotive is about forty hours. In the winter we lengthen the period to one hundred hours for the air filter cleaning program.

ANDREW CICHELLI: How many men do you have in your laboratory?

CARLYLE R. BURTON: Our laboratory group includes the following: a chemist, three technicians, and part of the time of a lubrication foreman. The technicians may collect samples, analyze the samples or keep the records. A total of five men constitute the laboratory force.

CY ROBB: I would like to know if the precipitation is measured, if you do analyses on the precipitation or do you accept the oil that you are now using? Is there any deterioration, or is there a constant precipitation? Do you analyze it to see if you are tearing your engine apart?

CARLYLE R. BURTON: We are not equipped in our small laboratory to analyze the sediment, but we have sent samples to some of the leading oil manufacturers who have sent us reports showing the percentage of the additive left in the oil. The composition of the sediment is iron, quartz and silica from the air and a percentage of lead, etc. We feel that by keeping down the percentage by volume of the dirt in the oil that we are partially minimizing ring or bearing wear, or, as you say, tearing the engine apart.

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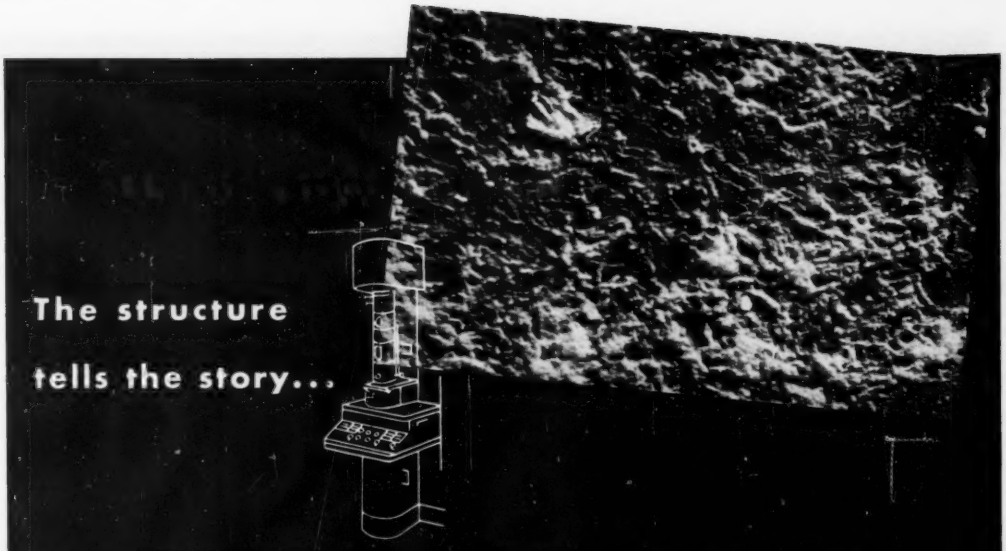

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The Technical Committee

Chairman T. G. Roehner, Director of the Technical Service Department, Socony-Vacuum Laboratories

Organization of Subcommittee on Recommended Practices for Packing Automotive Front Wheel Bearings

In the July 1951 issue of *The Institute Spokesman*, an article was published entitled, "Is Wheel Bearing Lubrication Progressing?" A further contribution on the subject was the complexity of packing automotive wheel bearings was made by Mr. D. G. Proudfoot in his paper which was presented at the 1951 Annual Meeting entitled, "Analyzing Wheel Bearing Grease Complaints," which was subsequently published in the December 1951 issue of *The Institute Spokesman*. These two studies of the problems and complexities of packing automotive wheel bearings generated considerable discussion of this whole matter at the meeting of the NLGI Technical Committee at the 1951 Annual Meeting of the Institute. As a result of this discussion, Mr. H. L. Hemmingway, of The Pure Oil Company, was appointed chairman of a subcommittee to consider the preparation of "Recommended Practices for Packing Automotive Front Wheel Bearings."

Early in 1952, Mr. T. G. Roehner, Technical Committee Chairman, circulated a questionnaire to all members of the Technical Committee asking what individuals in the companies represented would like to contribute their time and effort to the work of this subcommittee. Responses were received from ten people who form the subcommittee. The personnel showing interest in this project and who are members of the subcommittee are as follows:

Messrs. T. N. Bath—Battenfeld Grease & Oil Corp.
Warren A. Brown—Deep Rock Oil Corp.
L. W. McLennan—Union Oil Co. of California.
W. E. Pope—Consumers Cooperative Association
C. C. Schrotberger—Jesco Lubricants Co.
Martin Stark—Esso Standard Oil Co.
R. M. Welker—Gulf Oil Corporation.
Walter J. Ewbank—Cato Oil & Grease Co.
O. L. Yarham—Cities Service Co.

Briefly, the organization plan for the subcommittee is, first, to gather all of the step by step procedures that are available from grease manufacturers or oil companies or from other sources serving the oil industry. These various recommendations will be tabulated and combined into a master set of recommendations. Where there are differences in recommendations, these will be discussed with an attempt to arrive at agreement in the subcommittee as to what should be the recommended procedure. When this is done, it should constitute the first step in projected activity of the subcommittee which is to get general agreement of all interested people within the National Lubricating Grease Institute on what they would like to see as a complete set of recommended practices on the packing of automotive front wheel bearings. This first step should occupy the subcommittee for some period of time.

After the first step is completed, the next step probably will be to circulate these recommended practices among the manufacturers of equipment and bearings for their comments and suggestions. At this point it may not be possible to incorporate all of the suggestions, but it is the sincere hope of the subcommittee that some degree of agreement and compromise can be worked out so that much of the confusion surrounding this application of lubricating grease will either be substantially reduced or eliminated.

The NLGI Technical Committee will be kept advised of the activities of the subcommittee by means of this column and also the subcommittee reports which were made at the time of the annual meeting. Other Institute members who are interested in this project are cordially invited to participate.

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Patents and Developments

Smooth Texture Greases of High Stability

A lubricating grease which is claimed to be satisfactory for lubrication of metal surfaces over a wide range of temperature conditions, and having superior structural stability toward mechanical working is disclosed in U. S. Patent 2,588,280 issued to Standard Oil Development Co. It was found that the molecular weight distribution of the fatty acids used has a marked influence on structural stability.

For manufacturing grease compositions having the optimum structural stability, the mixture of fatty acids employed should contain 50% or more by weight of a single substantially saturated aliphatic acid having a carbon chain length of 16-22 carbon atoms, (256 - 340 mol. wt.) and about 10 - 30% by weight of a single saturated aliphatic acid (200-284 mol. wt.) having a carbon chain length 4 carbons fewer than the major component.

For this application, the hydrogenated fish oil acids are unsuitable since the molecular weight spreads of the fatty acids vary markedly. However, the hydrogenated tallow acids represent a fixed distribution in the required ratio, so that these, together with a smaller proportion of, say myristic acid or hydrogenated sperm oil acids, provides the desired acid mixture. A mixture of sodium and barium soaps is preferred.

The most desired structural stability is obtained with sodium-barium salts of mixed saturated fatty acids in the following molecular weight distribution:

C_{12}	7.5% by wt.
C_{14}	12.1% " "
C_{16}	23.5% " "
C_{18}	54.8% " "
Over C_{18}	2.1% " "

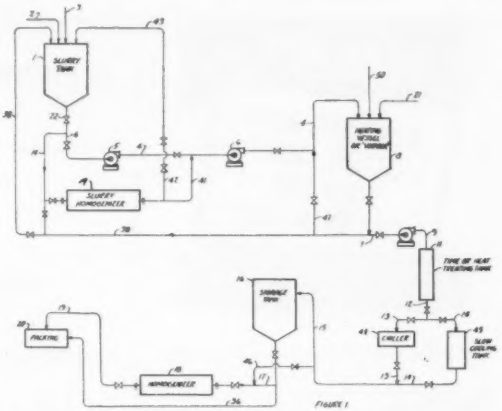
Such a controlled mixture of fatty acids is claimed to effect an improvement in the shear stability of lithium soap greases.

Bleed Resistant Stable Greases

Alkali or alkaline earth soap greases having excellent lubricating properties over a wide range of temperatures, which are stable under static or dynamic conditions and are resistant to bleeding, are disclosed in Shell Development Company's U. S. Patent 2,588,556.

The ability of controlling or modifying the fiber, crystalline or micelle structure of soaps or gelling agents in forming grease is extremely difficult. In this patent, the object is achieved by admixing a pre-made soap or saponifying agents with a portion of the base oil required to make the grease, and heating the mixture above the melting point of the soap until a homogeneous mass is obtained. The remainder of the base oil then is added together with additives, or modifying agents and the homogeneous grease mass is cooled from above its temperature of transition to the jelly phase, to below this transition but above 100° C., and the grease is heat-treated at a convenient temperature between 100° C. and the transition temperature, in a quiescent state until the desired soap fiber growth has been attained. Then the grease is cooled slowly with or without stirring or shock chilled to room temperature, homogenized and packaged.

The point is to heat-treat alkali or alkaline earth soap greases while they are in the expanded gel phase until a recrystallization and consolidation of soap crystallites into the desired fiber form have been attained..



In the accompanying flow diagram (Fig. 1), the premade soap or soap mixture in slurry tank 1 plus additives (added through line 3) are mixed with base oil from line 2 and heated to 80° C., then led through lines 4 and 14 to slurry homogenizer 7 where the mixture is worked at 120° C. The mixture then is returned to slurry tank 1 through lines 42 and 43 for further working and blending and discharged via pumps 5 - 6 to heating tank 8 held at 180°-250° C.

The hot grease is discharged from vessel 8 at a controlled rate through line 9 and pumped into time tank 11 when its temperature is just changing the phase from the jelly phase to the gel phase. The grease is allowed to remain here for 2 - 10 hrs. to allow for maximum recrystallization and consolidation of soap crystallites into fibers of desired length and structure while in the quiescent state. A formula is given for this purpose.

Thereafter, the grease is discharged into a slow cooling tank 45 or chiller 44, and stored in tank 16 or homogenized in 18 and packed at 20.

A particularly desirable stabilizing agent to be used with these greases in an alkylene glycol and/or alkylene thio glycol polymer as well as their monoesters and other polymeric derivatives. A suitable product is made by reacting n-butanol with propylene oxide at 212° - 230° F. under pressure in presence of an alkali catalyst.

Figure 2, prepared for a soda base grease, shows that an increase in mechanical stability (Shell Roll Test) is obtained with increase in heat conditioning up to an equivalent of 8 hours at 170° C. Beyond this degree of heat conditioning, a moderate decrease in mechanical stability is noted which may be related to some type of embrittlement of the fibers.

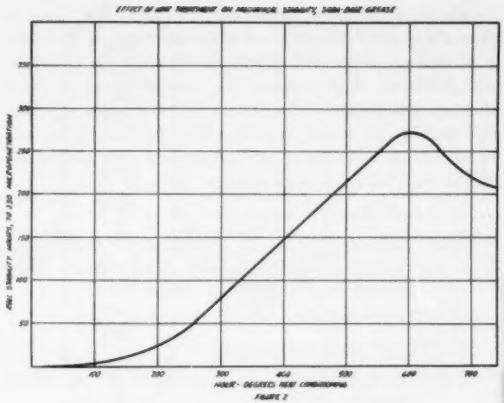
Among the greases which can be so produced are those containing sodium stearate, sodium oleate, potassium oleate, calcium stearate, barium stearate-acetate, strontium stearate-acetate, sodium 12-hydroxy stearate-oleate, zinc stearate, magnesium stearate, sodium palmitate, sodium soap of castor oil, sodium ricinoleate-stearate, lithium soaps, aluminum soaps, lead soaps, etc.

Corrosion inhibitors, such as N-primary amines containing 6 - 18 carbon atoms in the molecule, substituted oxazolines, oxazoline salts of fatty acids, etc., may be added, as well as extreme pressure agents such as phosphites, phosphates, thiophosphates, thiophosphites, sulfides, selenides, sulfurized compounds, chlorinated compounds, etc.

Additional ingredients to be added may be anti-wear agents such as oil-soluble urea or thiourea derivatives, also polymers, oiliness agents and pour depressors.

Greases Stabilized with Hydroxy Ether Acid Soaps

In its U. S. Patent 2,589,973, Standard Oil Development Company discloses the production of greases of improved stability by use of thickening agents such as the alkali, al-



kaline earth or aluminum soaps of branched chain hydroxy ether aliphatic acids such as 8-(beta-hydroxy-ethoxy)-stearic acid, 12-(beta-hydroxy-ethoxy)-stearic acid, 12-(beta-hydroxy-alpha-propoxy)-ricinoleic acid, 10-(beta-hydroxy-isobutoxy)-palmitic acid, etc.

Such acids may be prepared by reacting hydroxy acids (e. g. hydroxystearic) with an olefin oxide (such as ethylene or propylene oxide) preferably in presence of a Friedel-Crafts catalyst. As little as 3% or as much as 40% of the new type soaps may be used, based on the weight of the total grease.

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An example of one composition is given as follows:

10.00% hydroxy ether acid of invention of molecular weight about 363 (derived from ethylene oxide treatment of 12-hydroxy stearic acid)

1.23% $LiOH \bullet H_2O$

68.77% di-2-ethylhexyl sebacate

20.00% refined coastal type mineral oil of 37 S.U.S. viscosity at 210° F.

Such a grease has the following properties:

Free alkalinity (as LiOH) %	0.10
ASTM worked penetration, 77° F., mm/10	250
Penetration after working 10,000 strokes ASTM worker employing fine hole worker plate mm/10	297
Dropping point °F	358

Appearance—Excellent, smooth, buttery structures.

Soda and mixed base greases also may be prepared from these soaps.

Greases Containing Microcrystalline Wax Acids

The free high molecular weight microcrystalline wax acids have been found to give favorable lubricating properties and good stability to greases when they are employed as thickening agents, according to U. S. Patent 2,590,786 issued to Sinclair Refining Company.

These acids are prepared by oxidizing microcrystalline waxes having 34 - 55 carbon atoms per molecule in the presence of excess oxygen and 0.1 - 4% of oxidation catalyst at temperatures above 100° C. The pure C_{18} wax acids are separated and used for this purpose. They are essentially monocarboxylic acids and are extremely insoluble in water (claimed to be due to unusual chain length). They also have rust-preventive properties and are good oil-gelling agents.

Generally, an amount of 1 - 50% by weight of such acids is sufficient. In particular, 10 - 25% are the optimum amounts when the acid has a saponification number of 110 - 115 and a petrolatum melting point of 130° - 135° F.

In U. S. Patent 2,590,801 issued to the same company, it is pointed out that these wax acids may be in admixture with soaps of other organic acids. Details are given on the preparation of lithium greases from such wax acids.

News Item

Napthenates from spent caustic—Beychok (Petr. Proc. 5/52, p. 656).

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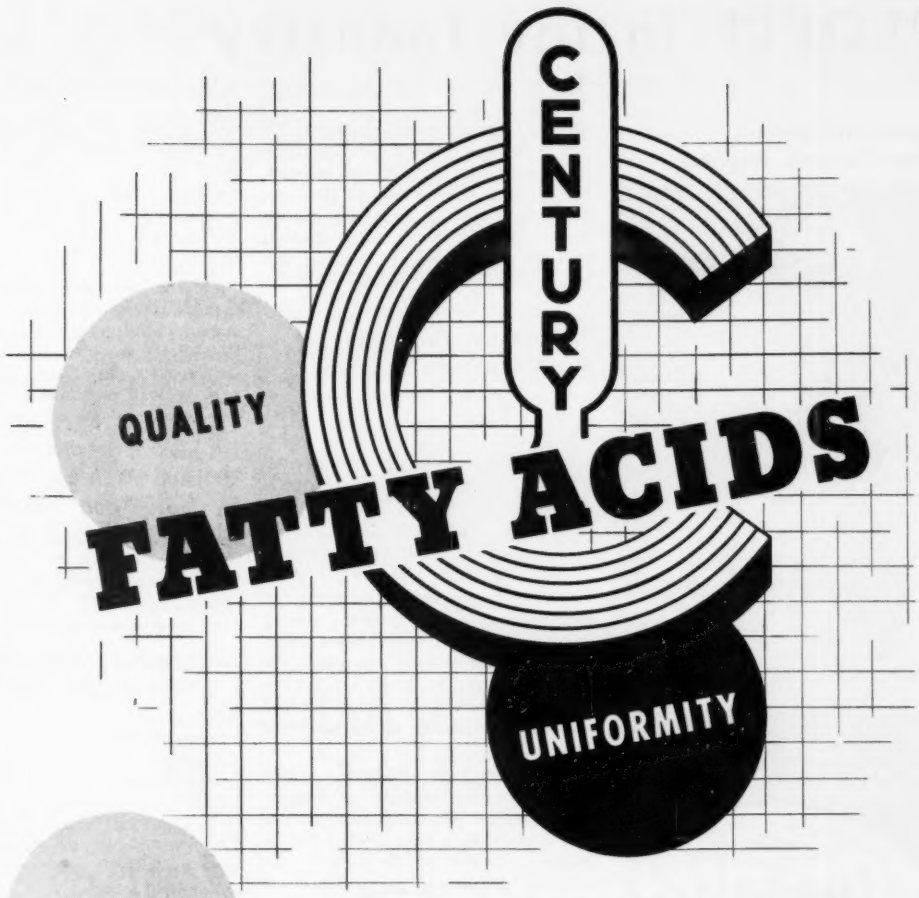

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PEOPLE in the Industry

Foote Welcomes New Ceramic Engineer

FLOYD J. WILLIAMS

Floyd J. Williams, Ceramic Service Engineer, has recently joined the Foote Mineral Company Sales Department. He will be assistant to John Clark, manager of ceramic sales, with special responsibilities for field evaluation of Foote research developments in the ceramic industry. Mr. Williams, a recent graduate of Ohio State University, is a member of the American Ceramic Society.

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Deep Rock Transfers R. A. Forsman to Tulsa

R. A. Forsman has been transferred from the Cushing, Okla., refinery to the Tulsa office as sales engineer, jobber sales department, it has been announced by J. H. Westbrook, jobber sales manager, Deep Rock Oil Corporation.

A native of Tulsa, Mr. Forsman received a B.S. degree in petroleum engineering from Tulsa University in 1941. Following his graduation, Forsman was employed as a service engineer with an industrial engine manufacturer until 1946, with a three-year leave during the war. As a navy lieutenant, he served in the capacity of a diesel engine specialist and spent 23 months in the Southwest Pacific.

In 1946, he took a job with a natural gas transmission company as assistant superintendent of compressor stations and worked there until 1948, when he became manager of the tankage and terminal department for a major oil company.

Mr. Forsman joined Deep Rock in 1949 as assistant chief engineer in charge of maintenance and has worked at the Cushing refinery until his present transfer.

Kiehn and Harrison Receive Promotions

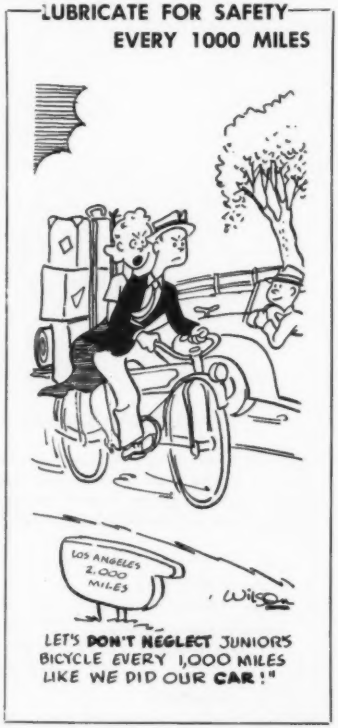
Robert L. Kiehn has been promoted to maintenance supervisor and Charles W. Harrison has been promoted to shift supervisor at Deep Rock Oil Corporation's Cushing, Oklahoma, refinery, it has been announced by W. J. Carthaus, manufacturing and research vice-president.

Mr. Kiehn came to work for Deep Rock in 1948 after graduating from Oklahoma A & M College. He has been in the engineering department at the refinery since starting with the company as a junior engineer. He was maintenance engineer before his latest promotion. In his new position Mr. Kiehn will have charge of all refinery maintenance and repairs.

Mr. Harrison was formerly pilot plant chemical engineer at the company's research and development plant in the Cushing refinery. He is a graduate of Oklahoma A & M and joined Deep Rock in 1948 as an assistant chemist in the refinery control laboratory.

Division Manager Named By Gar Wood Industries

C. J. Berini has been appointed division manager, Wayne Division Gar Wood Industries, Inc., according to an announcement by E. R. Leeder, executive vice-president. At the same time,


LUBRICATE FOR SAFETY
EVERY 1000 MILES
LOS ANGELES 2,000 MILES
LET'S DON'T NEGLECT JUNIORS BICYCLE EVERY 1,000 MILES LIKE WE DID OUR CAR!"

Mr. Leeder announced the appointment of H. D. Chicoine to the position of assistant division manager.

Formerly Wayne division works manager, Mr. Berini has served more than 20 years in the manufacturing industry. After operating the Service Stamping Company from 1931 to 1937, and serving as general manager of the Service Die and Engineering company from 1937 to 1941, he became president and general manager of Commercial Tool and Engineering company. He later served as president of the Commercial Metal Products company and prior to joining Gar Wood in 1951, he was plant manager of the George C. Knight Company.

Mr. Chicoine joins Gar Wood from the Strong Manufacturing company, Sebring, Ohio, where he served as factory manager since 1945. Previously, he was with General Motors Corporation as an Engineer in the Fisher Body and Ternstedt divisions.

Sinclair Announces Personnel Promotions At Research Laboratories

E. J. Martin, general manager and vice-president of Sinclair Research Laboratories, Inc., has announced that M. R. Fairlie has been promoted to director of lubricants research and that a newly created position under the heading of research associate has been filled by R. D. Pinkerton, former director of light oils at Sinclair Research Laboratories, Inc.

Mr. Fairlie, well known in the lubrication field, formerly held a position of assistant director of lubricants research for Sinclair. He started his career with Sinclair at its East Chicago refinery as a chemist in the experimental laboratory some 25 years ago. He has been connected with lubricants both in development and research for the past 18 years.

Mr. Pinkerton started his career with Sinclair in 1930 as a part-time employee during the summer while attending the University of Illinois. He graduated in June of 1932 with a major in chemistry. After graduation he became a full-time employee of Sinclair Development Department, where he worked on light oils. In 1942 and 1943, Mr. Pinkerton was sent to California to engineer the construction of aviation gasoline plants. Upon the completion of this job, he returned to his duties at Sinclair's Research and Development Department.

During the war, Mr. Fairlie was loaned to the United States Navy by Sinclair as a specialist on lubricants to work at the Naval Experimental Station at Annapolis. Upon completion of this work, Mr. Fairlie resumed his duties with Sinclair. This new position which Mr. Fairlie assumed will cover the direction of research and development work on lubricating oils, greases, waxes and cutting oils.

As research associate, Mr. Pinkerton will be able to devote all his time to the creation of new research projects, whereas in his former position he had to divide his time between research projects and administrative details.

EVERYBODY BUYS OIL IN
G.P.& F. UTILITY CANS
BECAUSE EVERYBODY CAN USE THEM

G. P. & F. Flexible Spout Utility Cans are so handy for so many uses—no wonder oil sales go up the moment these cans are displayed! These sturdy, steel shipping containers do more than just deliver your product. They'll give a real promotional push to your sales.

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OUTBOARD MOTORS
POWER LAWN MOWERS
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CAMPING STOVES
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Available in 2, 2½, 3, and 5-gallon sizes—complete with 8" detachable hose, hose storage clip on spout, and self-contained measuring cup.

Furnished in solid colors or lithographed with your own design, trademark or advertising message. Write for complete details and prices.

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PYRONATE* (Water Soluble)

HYPONATE* (Oil Free)

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- √ ***special emulsifying formulations***

Ask Sonneborn about PETRONATE, the oil soluble petroleum sulfonate available in various molecular weights: HYPONATE, an oil free petroleum sulfonate; and PYRONATE, a water soluble petroleum sulfonate effective as an emulsion breaking reagent.

Sonneborn petroleum sulfonates—superior in quality and possessing exceptional uniformity—are now made to fit a wide variety of specific needs. They can also be tailor-made to your exact specifications. You can rely upon prompt shipment.

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RESEARCH

Freeport Sulphur Elects Petersen Vice-President

Mr. Harluf C. Petersen, a native of St. Paul, Minnesota, has been elected a vice-president of Freeport Sulphur Company by the company's board of directors, it was announced June 30 by Langbourne M. Williams, Jr., president.

Mr. Petersen is a graduate of the Minnesota School of Mines. He became associated with Freeport Sulphur Company in 1934 at the Grande Ecaille, Louisiana, mine. After working in the company's production operations, he became superintendent of Land and Exploration. When Freeport entered the oil and gas field in 1949, he was put in charge of the program, with headquarters in Houston, Texas, where he now lives.

Freeport produces sulphur from mines in Texas and Louisiana and has some oil production in these and other states. The company has under way a $20,000,000 expansion program, the largest in its history, to develop three new sulphur mines. It also has intensified its oil and gas program.

W. R. Riggs Put in Charge Of General Services

E. J. Martin, vice-president and general manager of Sinclair Research Laboratories, Inc., has announced the promotion of W. R. Riggs to the position of manager in charge of general services. Mr. Riggs, who joined the Sinclair organization in 1932, is a chemical engineering graduate of Missouri School of Mines. His career with Sinclair has

(Continued on Page 28)

This Is a Letter We Like

. . . May I add that I have been glad to see, during the seven or eight years which I have been receiving it, the progress which has been made. The SPOKESMAN today is an excellent little journal for all who are interested in grease, from whatever angle. I wish you continued success in its production.

Yours sincerely,
H. N. Bassett
Warrington, England

"He just remembered that he hadn't made his reservation for the NLGI Annual Meeting at the Edgewater Beach Hotel in Chicago, October 27-29."

involved assignments in various divisions, including the lube research, engineering, and later as director of the pilot plant division.

During the critical wartime shortage of aviation quality gasoline, Mr. Riggs headed the engineering and construction of Codimer plants for several of Sinclair's refineries. This additive made available substantially large quantities of aviation gasoline. Sinclair was commended by the Petroleum Administration for War for completing in record time what seemed an almost impossible task in the absence of material and personnel. Several of these plants were built largely from salvage material. The citation called attention to the fact that the units were built ahead of schedule and at less than anticipated cost.

Mr. Riggs is well known in the South Suburban area, having been active in industrial and civic affairs in the Harvey-Flossmoor area during the past decade. He is a member of the American Institute of Chemical Engineers, American Chemical Society, the Harvey Area Industrial Relations Council, and the Harvey Association of Commerce.

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Now...for the First Time-
New All-Vegetable Oleic Acid!

NEW EMERSOL 240
Costs No More Than Regular Double-Distilled Oleic, Yet Offers Greater Stability!

Another great Emery first, Emersol 240 Vegetable Elaine has the iodine value range of regular Oleic Acid, yet is of all-vegetable origin. Priced at double-distilled Oleic Acid levels, Emersol 240 offers much greater oxidation stability as shown by Mackey Test results.

The initial color is comparable to double-distilled grades, and it has excellent color stability, unusually bland odor.

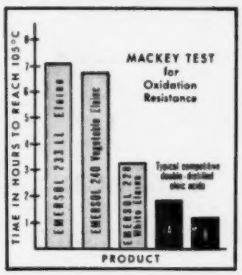
Check to see how Emersol 240 will fit your requirements:

Iodine Value:	84-90
Acid Value:	191-195
Saponification Value:	192-196
*Titer, °C:	15-20
Color (Lovibond, 5¼" cell):	15 Y/3R Max.

The complete line of *nine* different Emersol Oleic Acids including exclusive Emersol 240 and the purest Oleic Acid available, Emersol 233 LL Elaine, is your assurance that Emery has the Oleic Acid that is best for your specific application. Get the benefit of these superior Oleic Acids . . . Call Emery!

**Although not yet commercially available, samples of a low-titer vegetable Oleic are available for experimental purposes.*

Mackey Test of new Emersol 240 reveals that oxidation stability is just slightly under that of *Emersol 233 LL Elaine*, the *purest* Oleic Acid available.



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Mail Coupon today for Technical Bulletin giving full details on the new Emersol 240 Vegetable Elaine.

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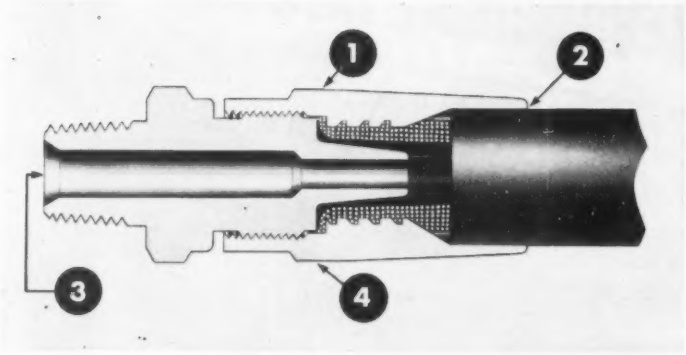
Industry NEWS

Lincoln Presents 'Lok-Tite' Reusable Couplings



This line of new couplings, developed by Lincoln Engineering Company, St. Louis, can be used over and over again wherever there are flexible hose lines.

1. LOK-TITE POSITIVE GRIP—When core of hose is inserted in sleeve, wire braid is flared and gripped between shoulder of stud and shelf of sleeve with tremendous clamping force. Eliminates dependence on pressure from wedging the core in the sleeve to hold coupling to hose — a disadvantage inherent in the design of other reusable couplings.

2. FASTER, EASIER ASSEMBLY—Bell-shaped counter bore of sleeve eliminates difficulty in starting hose into coupling. Wire braid on hose tends to expand or flare. Bell-shaped bore engages flared ends acting as a screw, simplifying assembly. To speed up assembly further, all couplings are notched to provide a gauge line for skiving outer cover of hose to correct length. Assembly of couplings to hose is easily accomplished by conventional method—no special tools required.

3. LARGER VOLUME FLOW—Extra large flow-passage in stud, plus shorter overall length of stud reduces restriction to a minimum.

4. ELIMINATES HOSE EXTRUSION—End of core is completely confined by metal—assures safer handling, positive leak-proof performance. Couplings are precision machined from steel bar stock, and zinc plated for protection against rust and corrosion. Can be detached and reused time after time. Exhaustive on-the-job tests have been made for burst strength and resistance to flexing and pulsation. They show that LOK-TITE couplings are equivalent in performance to a swaged-on coupling with the added advantage of being reusable.

More information is available from Lincoln Engineering Company, 5702-30 Natural Bridge Avenue, St. Louis 20, Missouri.

FISKE BROTHERS REFINING CO.

Established 1870

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Manufacturers of

LUBRICATING GREASES

Dr. C. N. Kimball Reports Research in Growing Demand

Increasing dependence of industry upon American technology is reflected in the semiannual report to the board of governors of Midwest Research Institute, Kansas City, by Dr. Charles N. Kimball, president.

Dr. Kimball points out that as each year passes, a larger number of industrial organizations are investing appreciable portions of their gross income in research as a practical form of business insurance. He cites the Institute's comitments for the coming year as an indication of this widespread trend.

"Research contracts signed during the past six-month period by clients for future work have increased by nearly 100 per cent over the same period in 1951, and 600 per cent over a similar period in 1950."

Dr. Kimball emphasizes that research must make sound economic sense to management and particularly it must show reasonable likelihood of profit from new products and processes. It is further shown that economic and scientific research are joining forces in industry to a marked degree.

New plants and processes stemming from work in the Institute's chemical engineering division illustrate such results. "Five new plants involving some $4,000,000 of capital expenditure for plant and equipment, employing 600 people, with an aggregate yearly business volume of $35,000,000 are now under construction due to the activities of this division alone," according to the report.

Specific examples of accomplishments by Midwest's technical staff during the past six months include development of

three new food products, production of several building materials from natural resources not previously exploited, design of new hospital equipment, preproduction evaluation of new products in several diversified fields, basic investigations in detergents and petroleum products.

Dr. Kimball's report also deals with operation of the Institute's new radioisotope laboratory, in which atomic fission by-products are applied to agriculture, industry, and medicine.

A new electronic analogue computer is another major research device installed at the Institute in recent months. It permits the solution of problems dealing with water, gas, and sewage distribution systems, petroleum pipe line networks, and large air conditioning systems, with much greater speed and accuracy than present mathematical methods.

The report shows the Institute's current rate of research expenditures is about a million and a quarter dollars annually, and that 101 sponsors were served during the last six-month period.

Space Nearly Sold Out For 1953 IPE at Tulsa

The petroleum industry is now preparing for its greatest oil show, the thirtieth anniversary International Petroleum Exposition, to be held at Tulsa May 14-23, 1953, according to President W. G. Skelly who announces that over 95 per cent of exhibitor space has already been reserved.

"Officers and committees of the IPE are getting into full swing to work out plans for every phase of the great show, such as the handling of international delegates who are expected from approximately 50 nations of the world; scientific exhibits in the Hall of Science; 'old timers' and safety events," said Wm. B. Way, general manager.

Invitations to the oil producing countries of the world have already been presented to their ambassadors in Washington and personal invitations to personnel in Latin-American countries will be presented in August by Governor Johnston Murray of Oklahoma and Oscar Irizarry, editor of Petroleo Interamericano, English-Spanish oil publication.

Mr. Murray and Mr. Irizarry leave August 1 to tour over 20 countries, bear-

Lincoln
BULLNECK* FITTINGS
The Only Complete Line of Grease Fittings with THE BALL-IN-THE-HEAD

SEALS DIRT OUT ... GREASE IN

Throat of Ordinary Hydraulic Fittings Clog with Dirt and Grit

Look at these Construction Features

FOUND ONLY IN LINCOLN BULLNECK* FITTINGS... AT NO EXTRA COST!

1. **Flush Ball Check**—Head can be wiped clean without forcing dirt into fitting and into bearing.
2. **Large Grease Passage**—The larger internal diameter permits greater flow of lubricant.
3. **Special Spring Design**—Spring cannot be compressed to restrict flow of the heaviest lubricants.
4. **Sturdier Construction**—Enlarged neck size and projecting locking pad protect against damage and wear.

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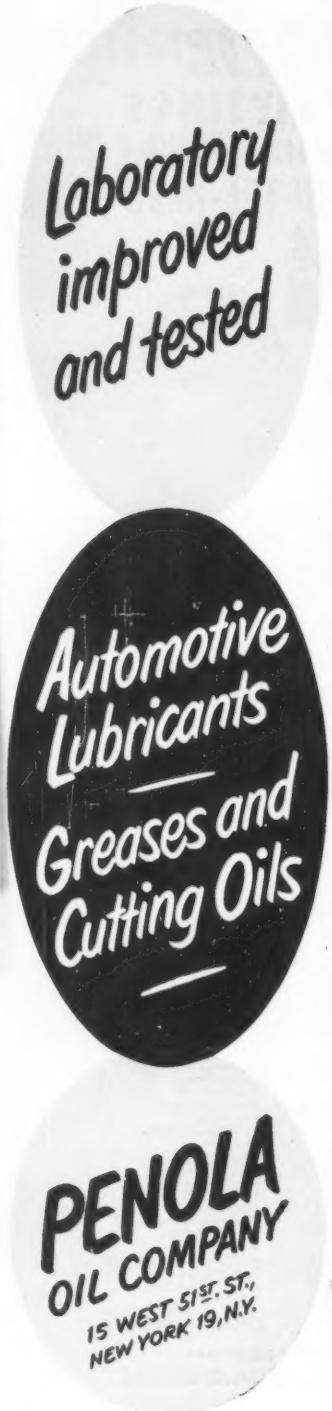

ing special engraved invitations from Mr. Murray and President Skelly.

The NOMADS, organization of oil equipment manufacturers who sell to foreign countries, are also participating in the program to build attendance from the various oil producing countries.

A special housing bureau, headed by Barton A. Myers, has been set up to assure those attending of getting the best possible space. The bureau is securing apartments and homes to allocate along with hotel rooms.

Chek-Chart Releases Truck Lubrication Guide

Lubricating more than nine million trucks is a mighty big job—and a profitable one too, for any service station operator who specializes in truck lubrication. The brand new "Fourth Edition Truck Lubrication Guide," published by The Chek-Chart Corporation, Chicago, is designed to help service station men everywhere provide proper lubrication for more than 85 per cent of trucks currently on the road.

This newest 96-page edition carries manufacturer-approved lubrication recommendations for all light and heavy trucks produced by 19 truck manufacturers in the last 10 years. Even some of the more popular older trucks have been included to give the most comprehensive coverage of truck lubrication recommendations available.

Within the handy 7-by-9-inch reference are 84 truck lubrication diagrams, 10 pages of popular axle unit diagrams, composite charts of trailer and semi-trailer components, six pages of general lubrication instructions, and also a page of diagrams and instructions covering lubrication of truck cab points. For larger trucks having many optional combinations of engine, transmission and differential, recommendations have been compiled in tabular form, thus making it easy to find different combinations without hunting through a number of cross-references.

Every service station operator or oil company salesman interested in truck lubrication service will find this edition a valuable reference.

A new $2,750,000 research center is planned by Humble Oil & Refining Co., Houston, Texas. The two new buildings will be completed in the fall of 1953.

Foote Mineral Receives Certificates of Necessity For Lithium Production

Foote Mineral Company announced receiving two certificates of necessity covering production of lithium chemicals as a portion of the 10-million-pound per year goal set recently by the Defense Production Authority. One certificate for $2,515,000 carries an 80% amortization and covers production of lithium chemicals at Sunbright, Virginia. The other certificate in the amount of $144,828.00 carries a 70% amortization and covers the mining of Spodumene concentrates at Kings Mountain, North Carolina.

These Certificates of Necessity represent a portion of the expanded facilities which Foote has planned for 1952-53 in the lithium chemical industry. As previously announced, the complete expansion program amounts to approximately three million dollars in facilities which will more than double the present U. S. production capacity of essential lithium chemicals.

Texaco Librarian Authors New Survey of Fatty Oils

Publication of an authoritative survey which covers its field in exhaustive detail—"Properties of the Principal Fats, Fatty Oils, Fatty Acids and their Salts"—has been announced by The Texas Company. The author of the new book is M. P. Doss, technical librarian of The Texas Company, who previously published a compilation—"The Physical Constants of the Principal Hydrocarbons"—which was adopted by the Technical Advisory Committee of the Petroleum Administration for War as its official standard during World War II.

The new book should be of considerable interest to the fatty oil, petroleum, and chemical industries, and especially to manufacturers of lubricants. In its 244 pages the new publication covers the properties of approximately 50 of the principal fats, fatty oils, and waxes. Mr. Doss surveys only aliphatic acids, but he tabulates the properties of more than 800 of these.

The unique part of the book is the data given on the salts of the fatty acids ranging from aluminum through zirconium. Approximately 1750 salts are listed. This material has never previ-

ously been brought together and it includes considerable unpublished data.

The book is the result of ten years' intensive search through published and unpublished data and literature. The scope of this search is indicated in the fact that Mr. Doss lists more than 1350 literature references. The book concludes with a variety of pertinent conversion tables (i.e., temperature, gravity, viscosity, color) and a detailed subject index.

It is now available for purchase from the Technical and Research Division of The Texas Company, 135 East 42nd Street, New York 17, N. Y. The price is $5.00. The book is uniform in size with Doss' previous survey of the physical constants of hydrocarbons—the page is printed horizontally.

The author has been Technical Librarian of The Texas Company for 26 of his 31 years' service with Texaco. Mr. Doss is a past chairman of the Program Committee of the Division of Chemical Literature of the American Chemical Society. He is active in the growing field of micro-documentation.

Morehouse Starts Plant Expansion

Preliminary excavating and foundation work was started early in July for plant expansion by Morehouse Industries of Los Angeles, manufacturers of high speed stone mills for food and chemical processing. A new building adjacent to the present headquarters plant and office building will comprise approximately 10,000 square feet, according to L. P. Smoot and Glenn Morehouse, who checked blue-prints and specifications for the new structure. The additional plant facilities, which will house the laboratory and machine shop, will greatly increase research facilities and will help to speed up customer research, it was anticipated, while plant capacity will be doubled.

Wincharger Announces 'Speedy-Shift' Attachment

Wincharger Corporation announces the development of a "Speedy-Shift" "wheelbarrow base type" attachment for Engine-Generator sets. Model 187 "Speedy-Shift" is for attachment to Models 700 and 1800 Engine-Generators, and Model 543 "Speedy-Shift" is for attachment to the Model 5000 Engine-Generator. The single handle permits the unit to be easily pulled instead of pushed. This is stated to be an advantage where the unit must be transported over rough surfaces. Sturdy semi-pneumatic rubber tired wheels are provided and located in reference to the center of gravity so as to provide a secure footing for the unit in conjunction with the double legs attached at the opposite end of the cradle base, and still so located as to accept the largest portion possible of the total weight of the unit. This is intended to relieve the operator and insure easy transportation of the unit. The "Speedy-Shift" base comes complete as a package and may be attached or detached from the standard cradle base in a matter of minutes.

Portability of the Engine-Generator sets themselves has been enhanced by the use of a belted engine-generator construction which permits higher, more efficient operating speeds and maximum weight reduction for both engine and generator.

For further information and descriptive literature, write to Wincharger Corporation, Sioux City 2, Iowa.

Gre-Zer-Ator Announced By National Sales, Inc.

A new and improved Gre-Zer-Ator is announced by National Sales, Inc., of Wichita, Kansas.

This new Gre-Zer-Ator is an improvement of the original one-man, one-hand grease gun, fitting on the refiner's original container.

The development of a new booster has made it possible to produce a greater volume of grease per stroke of the pressure valve handle, without air or electrical connections. The hydraulic booster readily develops up to 7000 pounds pressure, which is ample to handle the lubrication jobs of the farmer, construction contractor, and users of similar types of equipment. The new Gre-Zer-Ator will be of all-steel construction in a black oxide and zinolyte finish, with a brilliant red-orange steel cover assembly. For further information and catalog, write National Sales, Inc., 812 North Main Street, Wichita 5, Kansas.

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Steel Pails and Drums

FOR OILS, GREASES, ETC.

No. 9 Niles Pail with lug cover and pour spout.

NILES STEEL PAILS

ordinarily are supplied with bail handles. Fabricated from black steel—outside painted or lithographed to order. Removable tops with lug covers, with or without pour spouts. Also in tight head style. 3½ to 6 gallon capacities.

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55, 30 and 15 gallon capacities; and 100 lb. grease drums. Full open head or Bung type. Painted or fully decorated. Interior lacquered if desired.

100-lb. Niles Grease Drum with 14 inch full open top lug cover. Also made with 9 inch lug cover in center of head.

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465 Walnut Street • Niles, Ohio

FUTURE MEETINGS of Your Industry

SEPTEMBER, 1952

8-11 Socy. of Automotive Engineers (national tractor meeting and production forum), Hotel Schroeder, Milwaukee, Wisc.

8-12 Instrument Society of America (7th nat'l instrument conference & exhibit), Cleveland Auditorium, Cleveland, Ohio.

9-11 Oil Industry Information Committee, The Traymore, Atlantic City, N. J.

9-13 National Chemical Exposition—7th (Trail Blazers' section), Coliseum, Chicago, Ill.

10 American Petroleum Institute (Division of Marketing, Lubrication Committee), The Traymore, Atlantic City, N. J.

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CENTRAL POINT

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Buffalo, N. Y.

Manufacturers of Lubricants

That will bear

"YOUR" BRAND NAME

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DISTINCTION

10-12 National Petroleum Assn. (50th annual meeting), The Traymore, Atlantic City, N. J.

11 National Lubricating Grease Institute (Board of Directors meeting), Hotel Traymore, Atlantic City, N. J.

11-13 American Inst. of Chemical Engineers, Palmer House, Chicago, Ill.

12-13 Assn. of Desk & Derrick Clubs of North America (first convention), The Shamrock, Houston, Tex.

14-19 American Chemical Society (122nd nat'l meeting) (Petroleum Division), The Traymore, Atlantic City, N. J.

22-24 American Trade Assn. Executives (annual meeting), Royal York Hotel, Toronto, Ontario

23-24 American Petroleum Institute (Executive Committee of the Board of Directors), Greenbrier, White Sulphur Springs, W. Va.

25-26 Mid-Continent Oil & Gas Assn. (Louisiana-Arkansas Div. annual meeting). The Roosevelt, New Orleans, La.

25-27 Independent Oil Compounders Association (5th annual meeting), Edgewater Beach Hotel, Chicago, Ill.

OCTOBER, 1952

1-4 Socy. of Automotive Engineers (national aeronautic meeting, aircraft engineering display, and production forum), Hotel Statler, Los Angeles, Calif.

6-8 National Assn. of Oil Equipment Jobbers (2nd annual meeting), The Neil House, Columbus, Ohio.

8-9 American Socy. of Lubrication Engineers (First National Symposium on Fundamentals and Friction of Lubrication), Hotel Sherman, Chicago, Ill.

9-10 California Natural Gasoline Assn. (27th annual fall meeting), The Ambassador, Los Angeles, Calif.

12-18 Oil Progress Week.

13-15 American Petroleum Credit Assn., LaSalle Hotel, Chicago, Ill.

13-15 Texas Mid-Continent Oil & Gas Assn. (33rd annual meeting), Hotel Texas, Fort Worth, Texas

19 Natural Gasoline Assn. of America (southern regional meeting). The Blackstone, Tyler, Tex.

20-21 Independent Petroleum Assn. of America (annual meeting), Mayo Hotel, Tulsa, Okla.

20-22 American Oil Chemists' Socy. (fall meeting), Netherlands Plaza Hotel, Cincinnati, Ohio.

20-24 National Safety Council (40th national safety congress and exposition), Conrad Hilton Hotel, Chicago, Ill.

21-22 South Dakota Independent Oil Men's Assn., Alex Johnson Hotel, Rapid City, S. D.

22-24 Socy. of Automotive Engineers (national transportation meeting), Hotel William Penn, Pittsburgh, Pa.

27-29 National Lubricating Grease Institute (20th annual meeting), Edgewater Beach Hotel, Chicago, Ill.

29 Oil Trades Assn. of New York, Inc., Waldorf-Astoria, New York, N. Y.

30-31 Socy. of Automotive Engineers (national diesel engine meeting), Chase Hotel, St. Louis, Mo.

30 to Nov. 1 Rocky Mountain Oil and Gas Assn. (annual meeting), Cosmopolitan Hotel, Denever, Colo.

NOVEMBER, 1952

4-5 Nebraska Petroleum Marketers, Inc. (annual convention), Hotel Paxton, Omaha, Neb.

6-7 Socy. of Automotive Engineers (national fuels and lubricants meeting), Mayo Hotel, Tulsa, Okla.

8-13 Oil Industry Information Committee, Conrad Hilton Hotel, Chicago, Ill.

10-13 American Petroleum Institute (32nd annual meeting), Conrad Hilton Hotel and Palmer House, Chicago, Ill.

11-12 American Petroleum Institute (Board of Directors meeting), Conrad Hilton Hotel, Chicago, Ill.

13 American Petroleum Institute (Executive Committee meeting), Conrad Hilton Hotel, Chicago, Ill.

17-18 Oil Industry TBA Group (annual meeting), The Park Plaza and Chase Hotels, St. Louis, Mo.

19 American Standards Association (34th annual meeting), Waldorf-Astoria, New York, N. Y.

30 to Dec. 5 American Socy. of Mechanical Engineers, Statler Hotel, New York, N. Y.

DECEMBER, 1952

1-6 20th National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York, N. Y.

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FUTURE MEETINGS of The Industry

DECEMBER, 1952

7-10 American Inst. of Chemical Engineers (annual meeting), Hotels Cleveland and Carter, Cleveland, Ohio.

8-9 Chemical Specialties Mfrs. Assn. (39th annual meeting), Hotel New Yorker, New York, N. Y.

26-31 American Assn. for the Advancement of Science, Jefferson Hotel, St. Louis, Mo.

JANUARY, 1953

12-16 Socy. of Automotive Engineers (annual meeting and engineering display), Sheraton-Cadillac Hotel, Detroit, Mich.

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5-7 Missouri Petroleum Assn. (annual convention), Hotel President, Kansas City, Mo.

18-19 Iowa Independent Oil Jobbers Assn. (annual convention), The Savery, Des Moines, Ia.

MARCH, 1953

2-6 American Socy. for Testing Materials (spring meeting), Hotel Statler, Detroit, Mich.

4-6 American Petroleum Institute (Division of Production, Southwestern district), The Blackstone, Ft. Worth, Tex.

8-11 American Inst. of Chemical Engineers, The Buena Vista, Biloxi, Miss.

16-20 National Assn. of Corrosion Engineers (1953 conference and exhibition), Hotel Sherman, Chicago, Ill.

25-27 Socy. of Automotive Engineers (national production meeting), Hotel Statler, Cleveland, Ohio.

APRIL, 1953

15-17 National Petroleum Association (semi-annual meeting), Hotel Cleveland, Cleveland, Ohio.

20-22 American Petroleum Institute (Division of Transportation, products pipeline conference), Hotel Muehlebach, Kansas City, Mo.

26-29 American Inst. of Chemical Engineers (joint meeting with Chemical Institute of Canada), Royal York Hotel, Toronto, Canada.

MAY, 1953

4-6 Liquified Petroleum Gas. Assn. (annual convention & trade show), Conrad Hilton Hotel, Chicago, Ill.

11-15 National Fire Protection Assn. (annual meeting), Edgewater Beach Hotel, Chicago, Ill.

14-23 International Petroleum Exposition, Tulsa, Okla.

JUNE, 1953

2-3 American Petroleum Institute (Division of Production, Pacific Coast District spring meeting), Hotel Statler, Los Angeles, Calif.

29 to July 3 American Socy. for Testing Materials (annual meeting), Chalfonte-Haddon Hall, Atlantic City, N. J.

SEPTEMBER, 1953

13-16 American Inst. of Chemical Engineers, Fairmont and Mark Hopkins Hotels, San Francisco, Calif.

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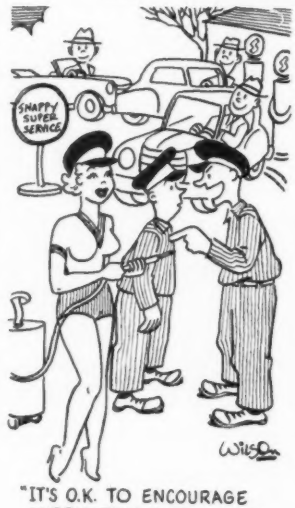

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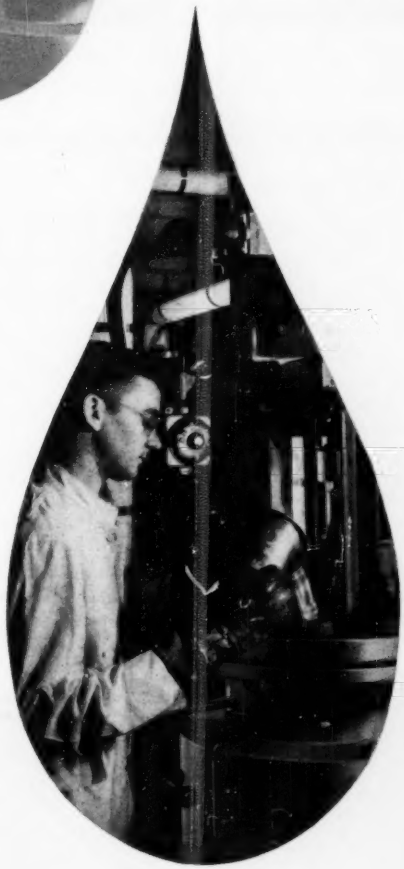

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